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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/583,152	06/16/2006	Takeshi Minami	062610	2564

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EXAMINER	
LIAO, DIANA J	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
04/05/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentmail@whda.com

Office Action Summary	Application No.	Applicant(s)	
	10/583,152	MINAMI ET AL.	
	Examiner	Art Unit	
	DIANA J. LIAO	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-16,18 and 19* is/are pending in the application.

4a) Of the above claim(s) *16,18 and 19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 10/26/2009 have been fully considered but they are not persuasive.

Regarding the new matter rejection, Applicants argue that the specification emphasizes the importance of high selectivity and that "one of ordinary skill in the art would understand that the specification implies that any selectivity about a certain threshold value is beneficial". However, this argument does not address the claimed inclusion of 100% selectivity, or very close to 100% selectivity. Neither the claimed ranges nor the specification offer guidance to show what the upper limit of the range should be understood to be. As drafted, the claims do allow for 100% selectivity, which is not supported by the specification.

Applicants argue that the factors affecting the selectivity need not be claimed or described since Wu '014 does not anticipate the claims. The examiner notes that Wu '014 was not used as an anticipatory reference but was rather used in an obviousness rejection. Applicants argue that achieving partial oxidation by only reducing the amount of oxygen in the reactant feed will increase the selectivity of CO and H_2, but not of methane, causing the production of synthesis gas to be lowered. However, the instant claims only seem to require the CO and H_2 selectivities to be high, and do not mention any required composition of synthesis gas in terms of proportions of CO, H_2 and methane.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 3-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added limitation to claim 1 claiming a minimum selectivity creates a range which includes a 100% selectivity, which is not demonstrated in the disclosure. The original disclosure on the whole does not specify any upper bound guideline.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1 and 3-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu, et al. (US 5,898,014).

Wu '014 teaches a catalyst composition comprising zirconium, cerium, neodymium and praseodymium components that are useful for the oxidation of hydrocarbons and carbon monoxide. (abstract) The catalytic composition comprises at least one precious metal, 40-80 wt.% zirconium component, 10-60 wt.% cerium component, and 2-15% wt.% of each neodymium and praseodymium components. (claim 6) This composition may further comprise at least one stabilizer. (claim 16) This stabilizer may be magnesium, barium, calcium or strontium (claim 17), which would be present from 0.05 to 30 wt.% based on the weight of the support material and stabilizer. (col 11, lines 13-15) A more quantitative composition is taught, reciting 0.01-2.5 g/in^3 of oxygen storage component, 0.025-0.5 g/in^3 additional zirconia, 0.025-0.5 g/in^3 additional rare earth metal and 0.025-0.5 g/in^3 of alkaline earth metal. (claim 25) The precious metals which are preferred include rhodium. (col 6, lines 63-67) Wu '014 also teaches this catalytic material to be present in the form of a layer on a honeycomb catalyst carrier, metal or ceramic (col 7, lines 38-44), which may be deposited by a washcoat. (col 14, lines 42-46) These carriers are disclosed to usually be of 200-400 cells per square inch. (col 14, lines 62-64)

Wu '014 does not teach zirconia to have a solid electrolytic property or that its composition to be a catalyst for producing synthesis gas. Wu '014 also does not explicitly teach a molar ratio of a second ingredient (Sc, Y or Lanthanoids) to a first ingredient (alkaline earth metal) to be 0.02 and 0.40 or a molar ratio of a third ingredient (zirconia) to the first ingredient to be 0.04 to 1.5. Wu '014 does not teach that the group VIII metal is carried at a rate of 100-50,000 weight ppm per unit weight of the carrier or at a rate of 2×10^{-7} to 5×10^{-3} mol/m^2 per unit surface area of the carrier. Regarding properties of zirconia, since the composition appears to be substantially similar to that of the claimed composition, it is held that a solid electrolytic property is inherent in the zirconia.

The limitation that the claimed catalyst composition is used to produce synthesis gas is found to be an intended use and thus does not have patentable weight. Wu '014 teaches that its composition can be used for the oxidation of hydrocarbons. One of ordinary skill in the art would appreciate that a catalyst which can achieve oxidation can be used for a process of partial oxidation if the reactants are given in an amount which only allows for such, for example a less than stoichiometric amount of oxygen. Therefore, the prior art is still found to read upon the instant claims.

Although the ratios of ingredients are not explicitly taught, Wu '014 does appear to teach overlapping ranges of ratios. If the alkaline earth metal is taken to be magnesium, the conversion from weight ratios to molar ratios becomes overlapping with those of the claimed ranges. For calculations, the molar mass of the cerium oxide, praseodymium oxide, and neodymium oxide were taken to be approximated by the

molar mass of CeO_2 because of the very close molar masses of Ce, Pr, and Nd, and the predominance of cerium oxide. The determination of the amounts of each component in the oxygen storage component were found based on the requirement that zirconia be present as 40-80% of the oxygen storage component. Calculations are summarized below:

	Oxygen storage component (g/in^3)			Plus additional oxides (g/in^3)			Molar amounts (div. by molar mass)		
	Total	ZrO_2	CeO_2	ZrO_2	CeO_2	MgO	ZrO_2	CeO_2	MgO
Min	0.01	0.004	0.002	0.029	0.027	0.025	0.000235	0.000157	0.000620
Max	2.5	2	1.5	2.5	2	0.5	0.0203	0.0116	0.0124
	Values calculated from claims 6, 16, and 25								

Ratio of 2nd component (CeO_2) to 1st component (MgO): 0.0126 - 18.73
Ratio of 3rd component (ZrO_2) to 1st component (MgO): 0.0189 - 32.71
A *prima facie* case of obviousness exists when the claimed ranges overlap or lie inside ranges disclosed by the prior art. See *In re Woodruff* 16 USPQ2d 1934.

These calculations were made assuming that the alkaline earth metal/stabilizer chosen was magnesium oxide.

Wu '014 does not address how much Group VIII metal is carried in terms of ppm per unit weight or mol/m^2 per unit surface area. However, it would have been obvious to optimize the amount and loading of the catalytic metal based on the process conditions and intended use.

Although Wu '014 does not specifically the teach the use of the catalyst composition for the creation of synthesis gas, a similar composition is still taught. Catalysts may be used in different processes and conditions in order to yield different outcomes.

Wu '014 does not specifically teach the use of ceramic foams as a support for the catalyst, nor specifically one of 10-40 cells per inch. However, Wu '014 teaches a honeycomb carrier of 200-400 cells per square inch. If the square root of the cells per square inch of the honeycomb taught in Wu '014 is taken, a value of approximately 14-20 cells per inch. This range overlaps the claimed range of 10-40 cells per inch. Ceramic foams are well known in the catalyst art for use in catalyzed gaseous processes and are structurally similar to honeycomb structures.

Therefore, due to overlapping ranges, claims 1 and 3-15 are not found patentable over the prior art.

7. Claims 1 and 3-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu, et al. (US 2003/0180215) in view of Yagi, et al. (US 6,376,423) and Allison, et al. (US 2002/0115730).

Niu '215 teaches a supported catalyst for the production of synthesis gas. The catalytic component may be rhodium. (claim 36) The porous support maybe at least one of zirconia, magnesia and ceria and also of calcium stabilized zirconia (claims 40 and 42) The general technique of applying the catalyst to a honeycomb-like or foam substrate is known in the art. (para. 16 and 17) However, particle beds have a better heat transfer characteristic than monolithic catalysts. (para. 19) But if the catalyst were to be best used in cartridge form, for example, it would have been obvious to one of ordinary skill in the art to create a monolith instead of using particles as mainly taught in Niu '215. The compositions are generally of very high CO and H_2 selectivity. (Table 5)

Niu '215 does not elaborate on the support material, and any ratios of the different support materials. However, Niu '215 discloses the three claimed ingredients for the catalyst support and it would have been obvious to one of ordinary skill in the art to combine more than one of the catalyst supports based on cost and promoting ability and optimize the composition for the creation of synthesis gas. Using a combination of known alternative supports is not found patentable over the prior art. The claimed ratios are also not found patentable over the prior without a clear showing of unexpected results and criticality.

Niu '215 also does not specifically teach the catalyst loading of the catalyst. However, it would have been obvious to one of ordinary skill in the art to optimize the amount of catalyst.

Alternatively, Yagi '423 teaches a catalyst for the preparation of synthesis gas. The catalyst contains at least one catalytic metal including rhodium (col 3, lines 9-12) and maybe supported on an oxide carrier of a single metal or mixed metal (col 3, lines 32-34) The metal oxides include those containing at least two metals such as Mg, Zr and La. (col 3, lines 63-65) Yagi '423 teaches magnesium oxide to be a preferred main oxide component by including it in all of its claimed catalyst compositions. (claim 1, note that claims are contained in a Certificate of Correction) Also taught in Yagi '423 is that the catalytic metal is supported in an amount of 0.001-0.08 mole% and the surface area of the catalyst being 5.8 m^2/g or less. (claim 1) This results are in a rate of 1.724×10^{-4} mol/m^2 or greater. Further calculating the mole percents of the rhodium or ruthenium metal on a carrier consisting essentially of magnesium oxide, using rhodium as the

catalytic metal, the rate of 25.24-2020 ppm per unit weight of the carrier is found. These ranges of the prior art overlap the claimed ranges and therefore a *prima facie* case of obviousness is found. In addition, it would be obvious to one of ordinary skill in the art to support as much catalytic metal as is sufficient for intended use of the product.

Regarding the honeycomb or foam and the cell density, Allison '730 teaches the use of a foam or a honeycomb as a support for impregnating or applying a washcoat of catalytically active material suitable for producing synthesis gas. The foam may be made out of a stabilized zirconia having 30-150 pores per inch. (para. 50) One of ordinary skill in the art would be motivated to use such a foam because they are well known in the art as catalyst carriers.

Therefore, due to optimization, claims 1 and 3-15 are not found patentable over the prior art.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA J. LIAO whose telephone number is (571)270-3592. The examiner can normally be reached on Monday - Friday 9:00am to 6:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

DJL